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14. ABSTRACT
This study serves as an examination of the need to optimize the organic rotary and tilt-wing composition within the Marine Expeditionary Unit (MEU) in order to provide the MEU commander the utmost flexibility and support in the accomplishment of any assigned mission. In order to achieve this end, this paper recommends that the ACE deploys (8) MV-22, (4) UH-1Y, (4) AH-1W/Z, and (4) CH-53E in support of MEU operations. Deploying less MV-22 assets creates additional maneuver space on confined amphibious shipping while enabling the ACE to deploy on a single LHD/LHA. The ability to mass aviation assets allows the MEU commander greater flexibility in the utilization of those assets towards mission accomplishment.

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MEU, ACE, MV-22 Osprey, UH-1Y Yankee, AH-1W Cobra, UH-1N, AH-1Z

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TITLE:
THE FACE OF THE ACE: RESTRUCTURING THE AVIATION COMBAT ELEMENT'S ROTARY AND TILT-WING COMPOSITION

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Executive Summary

Title: The Face of the ACE: Restructuring the Aviation Combat Element's Rotary and Tilt-Wing Composition.

Author: Major Matthew P. Capodanno, United States Marine Corps

Thesis: This study serves as an examination of the need to optimize the organic rotary and tilt-wing composition within the Marine Expeditionary Unit (MEU) in order to provide the MEU commander the utmost flexibility and support in the accomplishment of any assigned mission.

Discussion: For the past twenty years, the Aviation Combat Element (ACE) that supports the MEU did so around a core squadron of CH-46E medium lift helicopters while augmenting that capability with additional rotary wing assets to include the AH-1W Cobra (providing close air support), the UH-1N (providing utility support), and the CH-53E (providing heavy-lift assault support). As a number of these aircraft reach the end of their service life, these aircraft have been replaced with more capable successors. Most notably, the MV-22 Osprey provides significant enhancements as it relieves the CH-46E of its medium lift responsibilities. Also, the UH-1Y provides much needed relief to an aging UH-1N. Both the UH-1Y and the MV-22 offer the ACE increased capabilities in lift, speed, range, and endurance hereunto unknown. These aircraft are not without challenges. Although the MV-22 provides twice the capability its predecessor, it is also twice its size. On amphibious shipping, where space is at a premium, this yields quite a few challenges. Particularly, when a full MV-22 squadron embarks on an amphibious ship, there is no longer adequate space to fit all the components of the ACE. This has resulted in disaggregating the ACE's components amongst the ships in the Amphibious Readiness Group (ARG). In order to facilitate embarking the ACE aboard a single LHD, this requires a restructure of the ACE's deployed assets. In order to facilitate this endeavor, this study recommends that the ACE deploys with eight MV-22s, four AH-1W/Zs, four UH-1Ys, and four CH-53Ks.

Conclusion: In deploying the ACE as recommended, it will regain the capacity to deploy in its entirety aboard one ship of the ARG thereby allowing the MEU commander the ability to mass his assets if the need arises or parcel them out to facilitate concurrent operations. It will eliminate spatial considerations as a requirement to disaggregate ACE assets thereby offering the MEU commander the flexibility required to respond to assigned missions or crisis situations.

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

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Preface

With the introduction of the MV-22, the Aviation Combat Element (ACE) of the Marine Expeditionary Unit (MEU) has provided increased capabilities in aviation assault support that were previously non-existent. However, these advancements have arrived with a price. As recent MEU deployments have shown, the deployment of a full Marine Medium Tiltrotor Squadron (VMM) in support of a MEU has placed significant burdens on naval amphibious shipping. These burdens have resulted in the need to disaggregate ACE assets amongst aviation capable shipping within the Amphibious Ready Group (ARG). This has yielded issues regarding the ability for the MEU commander to mass his fire and/or assault support and has placed a significant strain on an already complex supply system. In order to alleviate this condition, this study recommends reconfiguring the ACE's components to fit on a single ship while retaining (and in most cases exceeding) the capabilities offered by ACEs of the past. This paper does not take into account the impact the F-35B Joint Strike Fighter (JSF) will have on shipping; rather, it makes the assumption that the number of F-35Bs will not exceed the footprint created from the current deployment of the AV-8B. Additionally, this paper assumes that despite budgetary constraints, the procurement of the UH-1Y, MV-22, and AH-1Z will continue to proceed as currently scheduled at the time this study was conducted.

I would like to also take this opportunity to thank those individuals that have provided their assistance or support in this endeavor. LtCol Brian Smith, LtCol Erik Arrington, Maj Russ Rybka, Maj Darren Fox, Maj Pete Herrmann, Maj Wilson McGraw, Maj Doug Thum, Capt Jon Brandt, Capt William Wallace, Mr. Kevin Nace, and the MV-22 division at MAWTS-1 have contributed to the technical aspects of this paper and I am forever indebted for their gracious contribution of time and resources. Additionally, I would like to thank my mentor, Dr. Paul Gelpi, for dedicating his time and resources to my development as a writer and enhancing my

ability to think critically. Finally, I would like to express my deepest thanks and appreciation for my wife, Julie; son, Dominic; and daughter, Sarah. Without their love and support I would not be half the person I am today.

The Marine Corps of 2025 will fight and win our Nation's battles with multi-capable MAGTFs, either from the sea or in sustained operations ashore. Our unique role as the Nation's force in readiness, along with our values, enduring ethos, and core competencies, will ensure we remain highly responsive to the needs of combatant commanders in an uncertain environment and against irregular threats. Our future Corps will be increasingly reliant on naval deployment, preventative in approach, leaner in equipment, versatile in capabilities, and innovative in mindset. In an evolving and complex world, ***we will excel as the Nation's expeditionary "force of choice."***[1]

-General James T. Conway, USMC
34th Commandant of the Marine Corps

INTRODUCTION

In order to excel as the "Nation's expeditionary 'force of choice'" as described by General Conway, the organization of the Marine Corps must facilitate the ability to mass and integrate critical combat elements while rapidly deploying those elements to a theater of interest. At its core, the Marine Corps sustains this capability via the Marine Air Ground Task Force (MAGTF). At the heart of the MAGTF, lies the Marine Expeditionary Unit (MEU). A MEU refers to a MAGTF "[that consists] of a Command Element (CE), Ground Combat Element (GCE), Aviation Combat Element (ACE), and Logistics Combat Element (LCE)."[2] The MEU's mission is to:

> Provide a forward deployed, flexible sea-based MAGTF capable of conducting Amphibious Operations, crisis response and limited contingency operations, to include enabling the introduction of follow on forces, and, designated special operations, in order to support the theater requirements of Geographic Combatant Commanders (GCC).[3]

Commonly, a MEU retains the capabilities to operate in a sea-based forward presence to provide an expeditionary force, remain adept at crisis response, maintain fluency in combined arms integration, and be capable of interoperability with adjacent forces all while forward deployed.

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[1] Commandant of the Marine Corps, *Marine Corps Vision and Strategy 2025*. (Arlington, VA: U.S. Marine Corps and Office of Naval Research) 2008, 6
[2] Commandant of the Marine Corps, *Policy for Marine Expeditionary Units (MEU) and Marine Expeditionary Units (Special Operations Capable) MEU(SOC)*, August 4, 2009, MCO 3120.9C, 4.
[3] Commandant of the Marine Corps, *Policy for Marine Expeditionary Units (MEU) and Marine Epeditionary Units (Special Operations Capable) MEU(SOC)*, 4

In order to achieve these capabilities, the Aviation Combat Element (ACE) of the MEU provides the commander capacity to employ his force in a variety of ways to achieve any assigned mission successfully. Over the next two decades, advancements in Marine aviation platforms will greatly enhance this capability. The STOVL capability of the MV-22 coupled with its speed and lift capability yields a tremendous improvement over its predecessor, the CH-46E. Additionally, the UH-1Y (commonly referred to as the Yankee) relieves an aging UH-1N fleet, which yields the return of a true utility platform to the ACE and the Marine Corps aviation community overall. The AH-1Z and CH-53K will replace the AH-1W and CH-53E, respectively, and enhances the mission sets of each aircraft. By 2025, this upgraded fleet of rotary and tilt-wing aviation will provide the MEU commander support and capabilities previously unknown. However, the ability to fully and successfully integrate the ACE within the MEU depends on the appropriate balance found within the composite squadron. This study serves as an examination of the need to optimize the organic rotary and tilt-wing composition within the MEU in order to provide the MEU commander the utmost flexibility and support in the accomplishment of any assigned mission.

In order to establish the optimal composition for any MEU's ACE, it must conform to the strategic vision set forth by leaders of the nation and Marine Corps as articulated in the President of the United States' strategic guidance, "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense." Despite requisite cuts in defense spending, the President mandates that the Department of Defense (DOD) remain capable of accomplishing ten missions: [4]

1. Counter Terrorism and Irregular Warfare
2. Deter and Defeat Aggression
3. Project Power Despite Anti-Access/Area Denial Challenges

[4]U.S. Department of Defense . *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*. Arlington, VA: Department of Defense, January 5, 2012, 4-6.

4. Counter Weapons of Mass Destruction
5. Operate Effectively in Cyberspace and Space
6. Maintain a Safe, Secure, and Effective Nuclear Deterrent
7. Defend the Homeland and Provide Support to Civil Authorities
8. Provide a Stabilizing Presence
9. Conduct Stability and Counterinsurgency Operations
10. Conduct Humanitarian, Disaster Relief, and Other Operations

Among the missions listed, several remain within the scope of the MEU. As such, optimizing the composition of the ACE is critical to facilitate these missions.

Foreshadowing the President's directives, General James T. Conway, Thirty-fourth Commandant of the Marine Corps, guided the service's long-term strategy with *Marine Corps Vision and Strategy 2025*. Two USMC core competencies established in *Vision and Strategy* are the ability to conduct joint forcible entry operations from the sea and provide forces for service aboard naval ships, on stations, and ashore.[5] The Marine Corps' ability to build and deploy multi-capable MAGTFs directly facilitates these competencies. In order to be successful, the organization of the MAGTF must operate as an "integrated system through the air, land, and maritime domains, and the information environment."[6] The key to successful integration lies in optimizing the organizational assets within the command elements.

As a permanently standing MAGTF, the MEU actively satisfies these competencies and the missions delineated under the President's recent guidance. Advancements in technology facilitate the MEU's ability to embody itself as a more capable force than ever before with the potential to be leaner. As the ACE continues to develop with more modern advancements, the organic aircraft contained therein facilitate this leaner, more capable concept. Specifically, the Marine Corps' "STOVL assets improve the agility and utility of the ACE and its contribution to

[5]Commandant of the Marine Corps, *Marine Corps Vision and Strategy 2025*. (Arlington, VA: U.S. Marine Corps and Office of Naval Research) 2008, 9-10
[6]Commandant of the Marine Corps, *Marine Corps Vision and Strategy 2025.* 18

[the MAGTF and] the joint fight."[7] However, in order to successfully achieve this leaner state, the rotary and tilt-wing composition must first be optimized to do so.

MEU ACE COMPOSITION: HMM (REIN)

The ACE component of the MEU is built around a core squadron augmented with additional aircraft and personnel from the Marine Air Wing (MAW). Prior to the advent of the MV-22, the ACE constructed itself around the HMM which employed the CH-46E. With regard to additional rotary wing capability, the HMM augmented itself with the CH-53E to support heavy lift requirements, the AH-1W for close air support, and the UH-1N for utility support. Typically the reinforced composite squadron consisted of (12) CH-46Es, (4) CH-53Es, (4) AH-1Ws, and (3) UH-1Ns. For nearly forty years, the CH-46 served as the Marine Corps' medium lift helicopter. As the CH-46 approached the end of its service life, the Marine Corps developed

CH-46E/MV-22 Technical Comparison[8]		
Capabilities	CH-46E	MV-22
Max Gross Weight	24,300	60,500
External/Internal Load (lbs)	4,300/4300	15,000/10,000
Combat Troop Capacity	12	24
Capabilities	CH-46E	MV-22
Combat Radius (sea/land)	75nm/75nm	273nm (18 Marines)/277nm(24 Marines)
Max airspeed (kts)	145	275
Self-deploy	No	Yes (2631 nm with 1AR)

Table 1.

[7] Commandant of the Marine Corps, *Marine Corps Vision and Strategy 2025*. 22
[8] LtCol Timothy C. Hanifen, USMC, "The MV-22 Osprey Part 1: Performance Parameters and Operational Implications," *Marine Corps Gazette*. 83, no. 3 (March 1999): 59.

and fielded the MV-22 Osprey. The Osprey outperforms the CH-46 in every category of performance (see Table 1).

From Table 1, it is clear that the MV-22 brings a tremendous capability to the ACE. This is evidenced by "the application of vectored thrust technology in the MV-22 [which] combines the speed, fuel efficiency, altitude performance, and aerobatic capability of a fixed wing aircraft with the ability to perform vertical take-off/landing/hover operations and maneuverability of a helicopter."[9] By applying simple arithmetic, even a cursory glance illuminates the increased capability of the aircraft over its predecessor. With regards to lift capacity, the MV-22 outperforms the CH-46 by nearly 50%. Essentially, the MV-22 retains the capability to complete missions that in the past required two (in some cases three) CH-46Es. Despite obvious advancements in capability, the MV-22 comes with a price. This price manifests itself in the MV-22's sheer dimensions.

MEU ACE COMPOSITION: VMM (REIN)

The reinforced VMM that deploys in support of the MEU resembles the HMM with (4) AH-1Ws, (2-3) UH-1Ns, and (4) CH-53Es augmenting the capability of the core squadron of (12) MV-22s. However, a comparison of VMM capabilities to those of the HMM suggest any similarities are superficial.

As mentioned previously, the ACE traditionally manifested itself about a core HMM with the CH-46 as its base. Subsequent deployments of the MV-22 created an ACE reinforced squadron with the VMM as its core. Each VMM possesses twelve MV-22s. As demonstrated in Table 1, the capability of a VMM eclipses that of a HMM. By comparison of the ability to

[9] John J. Gamelin, "The MV-22 Osprey; Changing the Face of Assault Support Operations." (Master's Thesis, Marine Corps University, 2000), 10.

transport Marines to and from shore, a fully operational HMM maintained the ability to carry one hundred and forty-four Marines. In contrast, a fully operational VMM operating from naval shipping transports nearly two hundred and sixteen Marines. In comparing the ability to carry Marines, the VMM yields a thirty-three percent advantage over its predecessor HMM. While capable of outperforming its predecessor on a level of 3:1, the MV-22 is nearly twice the size of the CH-46. Although this size differential may not impact shore based operations significantly, the ability to deploy a squadron aboard amphibious shipping proves challenging at best. The effect of these challenges prohibits the ability to deploy the ACE in its entirety on a single LHD. However, the MV-22 is but one new dynamic introduced to the MEU and the Amphibious Ready Group (ARG).

In the coming years, the MEU will receive an additional upgrade to its capabilities with the addition of the UH-1Y. For nearly forty years, the UH-1N Huey served the Fleet Marine Force as its utility platform. Capable of performing multiple operations, the Huey served as a force multiplier for the MEU and ACE commander. As the Huey's potential grew, so did its Mission Essential Tasking List (METL) as evidenced in Appendix A. However, the years of service took a tremendous strain on the platform. As the Huey received additional technological advancements (Forward Looking Infrared Sensors, increased electronic support sensors, etc), it failed to receive the appropriate transmission and mechanical advancements to offset the increase in weight to the airframe. As such, it was forced to balance time-on-station requirements with the necessity to carry ordnance, passengers, or equipment. Despite these performance limitations, the Huey persevered while performing single role utility missions to the best of its ability.[10]

[10] Tres C. Smith, "'Back to the Future:' The UH-1Y Utility Helicopter; A Multi-Role Solution for a Changing Security Environment," (Master's Thesis, Marine Corps University, 2008), 8-9

Fortunately, relief for the venerable UH-1N arrived in the form of the UH-1Y Venom, or more commonly referred to as the "Yankee." A four-bladed version of its former self, the Yankee provides tremendous performance enhancement over its predecessor. Much as the MV-22 improved the capability of the ACE's assault support, the Yankee greatly augments the ACE's capability to provide utility support. A comparison of the UH-1N to the UH-1Y as depicted in Tables 2 and 3 quickly illustrates this enhanced capability. Essentially, the UH-1N performs admirably at any single task assigned. However, the Yankee's capabilities enable it to perform multiple tasks in a single mission. Thereby, this capability enables the MEU commander to fully exploit a utility platform that had been previously unavailable for the past fifteen years.

UH Mission and Performance Specifications[11]	
UH-1N Mission Description	UH-1YMission Description
• Command and Control • Combat Assault Support • Convoy Escort • Control of Supporting Arms • Special Operations Support • Reconnaissance • CASEVAC • SAR Augment • TRAP	• Command and Control • Armed Escort • Armed Recce • Control of Supporting Arms • Special Operations Support • CASEVAC • SAR Augment • TRAP

Table 2.

[11] Smith, Appendix C.

Figure 1. UH-1N[12]

Figure 2. UH-1Y[13]

UH Mission Performance Specifications[14]			
UH-1N Performance		UH-1Y Performance	
Max Gross Wt	10500 lbs	Max Gross Wt	18500 lbs
Max Internal Fuel	1360 lbs	Max Internal Fuel	2584 lbs
Ordnance	(7) 2.75" Rockets .50 Cal M240D GAU-17	Ordnance	(14) 2.75" Rockets .50 Cal M240D GAU-17
Personnel	4 combat loaded Marines*	Personnel	8 combat loaded Marines**
Combat Radius w/personnel	63 NM	Combat Radius w/personnel	129 NM
Cruise Speed	100 kts	Cruise Speed	153 kts
*Personnel cannot be carried in conjunction with full ordnance load.		**Personnel may be carried **with** full ordnance load.	

Table 3.

While the increased capabilities afforded the MEU commander remain impressive, this increase in performance comes with a price. As alluded to previously, the MV-22 offers unique challenges in addition to its performance enhancements. In particular, these challenges manifest

[12] Naval Air Systems Command, Aircraft and Weapons (online), http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=C072BDDC-C310-4D60-AB58-10F1F940B28C

[13] Naval Air Systems Command, Aircraft and Weapons (online), http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=C072BDDC-C310-4D60-AB58-10F1F940B28C

[14] Tres C. Smith, "'Back to the Future:' The UH-1Y Utility Helicopter; A Multi-Role Solution for a Changing Security Environment," (Master's Thesis, Marine Corps University, 2008), Appendix C.

themselves in the spatial footprint with which the aircraft requires. Recent MEU deployments highlight this phenomenon.

In 2010, the 24th MEU deployed with VMM-162(REIN) serving as its ACE. During the course of this deployment, the squadron deployed aboard the *USS Nassau*, LHA-4. A Tarawa-class amphibious assault ship, the *Nassau* retains a smaller capacity for men and equipment than her larger Wasp class amphibious assault ships. However, the *Nassau* and her sister ships in the class proved capable for years of supporting a full ACE with her entire contingent of aircraft, personnel, and material. At least, this capability existed to support an HMM. This quickly proved otherwise for a VMM. With respect to the 24th MEU, it became readily apparent that the *Nassau* was physically incapable of supporting the entire ACE contingent by allowing it to successfully maintain its equipment and conduct flight operations. As a result, the ACE split its aviation assets across the fleet ultimately transferring all of its UH-1N and AH-1W assets to an LPD assigned to the ARG. While freeing space, this practice of disaggregating the ACE placed complications elsewhere. In particular, facilitating maintenance support of the UH and AH assets placed a tremendous strain on the supply system. Additionally, the ARG conducted split operations on a number of occasions. These split operations resulted in the LPD operating hundreds of miles away from the *Nassau*. As a result, the MEU commander no longer retained the ability to mass his close air support fires with the preponderance of his assets. While saving space, this practice forced the MEU commander to relinquish tactical resources thereby inhibiting his ability to mass his close air support and utility capabilities. Fortunately, in the case of the 24th MEU, it conducted a successful deployment without negative consequences.

RESTRUCTURE

While MEUs commonly conducted split operations in the past, the impetus for these operations manifested themselves via the commander's decision to array his forces to meet multiple assigned missions. As previous examples indicate, current ACE assets are disaggregated due to physical limitations of amphibious shipping with respect to the increase of the ACE's physical footprint. Restructuring the ACE by reducing the number of deployed MV-22s while supplementing it with additional UH-1Y support will alleviate this condition.

The first transition involves reducing the number of MV-22s deployed. For decades, the HMM and subsequently the VMM formed the core organization of the MEU's ACE. Both units maintain the capability to rapidly assimilate their reinforcing units both administratively and, through a rigorous training period, tactically. Due to this capability, VMMs should remain the core for a reinforced squadron. Currently, the T&R requirement to deploy all the VMM's MV-22s remains a holdover from the HMM model. The current VMM model literally ceases to fit the capabilities of the Navy's amphibious capability. Deploying only a portion of the MV-22's within a VMM provides a solution to this challenge.

As previously indicated, the MV-22's capabilities for assault support exceed those of the CH-46 roughly 2:1. While formidable, the increased capacity for lift pales in comparison to the other advantages afforded the MV-22 in speed, range, and the resultant sortie generation. With the CH-53E and its successor, the CH-53K; the ACE retains its capability for heavy lift. The MV-22 affords the MEU commander incredible benefits in its ability to conduct over the horizon (OTH) operations. This capability certainly provides the MEU commander with greater flexibility and a greater capability than previously available. The MEU commander can retain this OTH capability while retaining the medium lift capability as it existed previously under the

HMM by simply deploying fewer MV-22s. Particularly, the VMM, under this proposed construct, deploys eight MV-22s vice the current twelve as prescribed by the T&R.

With a full contingent of twelve MV-22s deployed, this gives the MEU commander the ability to lift two hundred and sixteen Marines from amphibious shipping if all twelve aircraft are mission capable. The same number of CH-46s lifted one hundred and forty-four Marines with a much more limited range and speed as compared to the MV-22. Deploying eight MV-22s offers the MEU commander the capability to lift the same amount of Marines previously afforded the CH-46. However, the capability with which the MV-22 accomplishes this task far exceeds that of the CH-46. With three times the endurance and speed of its predecessor, the MV-22 still offers significant advantages for the MEU commander despite a decrease in aircraft numbers deployed.

This eight plane construct presents a few challenges to the VMM. Primarily, the four non-deployed MV-22s present the greatest issue. The VMM should absolutely retain these assets for support of MEU operations. At present, the MV-22's ability to self-deploy is an extremely underutilized capability. Using the C-130 construct as a model, one can see the practical application that could be implemented for the MV-22. If a mission arises that requires additional capability inherent in the remaining MV-22s, those aircraft have the capability to deploy to the region autonomously to augment the force when it arrives, before it arrives, or at a suitable time thereafter given timing considerations. The following scenario illustrates this potential.

Hypothetically, a natural disaster strikes Haiti. A recently deployed MEU receives directives to provide Humanitarian Assistance and Disaster Relief (HA/DR) to alleviate the suffering. While the amphibious fleet is en route, the MEU commander determines that he

requires additional lift support to evacuate displaced personnel. As a result, two additional MV-22s deploy to the region to augment the capability already existing on shipping. By utilizing the incredible advantages in speed and range of the MV-22, these self-deployed MEU assets could base out of Haiti's airport, Guantanamo, or other ships in the ARG.

A MV-22 quick reaction force (QRF) is just one utility that the remaining aircraft could facilitate. A growing mission of the MV-22 on recent MEU deployments included the execution of Parts, Mail, and Cargo (PMC) missions. During these missions, the MV-22 took advantage of its increased pay-load capacity, speed, and range attributes to shuttle men and material from ship to shore that would otherwise had taken significantly longer under normal means. Several current MV-22 pilots, when presented with this model, expressed interest in establishing forward detachments for the aircraft located near critical supply hubs to include Rota, Sigonella, or Djibouti. Speaking of his experiences on a recent deployment, one MV-22 pilot commented, "With the LHD remaining [approximately] two-hundred and fifty miles from the nearest logistics node for the majority of this deployment and the Navy's inability to cover that ground by air, I can't stress enough how much PMC we moved to and from the ship." In his view, "a shore base [detachment] pushing parts out to the ARG vice us pulling them would alleviate that burden."[15] Not only would the reduction of deployed Ospreys alleviate some spatial concerns, but provide those aircraft deployed on the ARG greater flexibility to focus on mission accomplishment vice PMC restraints that potentially interfere with other tasks.

In addition to the detachment of MV-22's serving as a PMC shadow to the ARG, an alternative for the detachment's operations include the conduct of Theater Security Cooperation Missions throughout the region assigned to the MEU. In doing so, the potential exists to alleviate

[15] Capt Jonathan H. Brandt, USMC personal e-mail to author.

ACE assets from this task thereby freeing it to focus on other assigned missions.[16] Essentially, this detachment offers the MEU commander a force multiplier while alleviating much needed deck and hangar space aboard the LHD.

In conjunction with a reduction in MV-22 deployment, the MEU will augment its Yankee composition. The increased capabilities presented to the MEU commander via the Yankee's introduction is striking. As depicted in the comparison of the two platforms, the Yankee outperforms the UH-1N in every capacity. The deployment of four UH-1Ys supplanting the two to three UH-1Ns currently deployed greatly enhances the ACE's capabilities. The capability to insert/extract Marines expands rapidly from the UH-1N's twelve individuals (with limited self-defense weapons) to the Yankee's ability to transport thirty-two individuals and retain the ability to carry a full armament load to support those Marines' close air support requirements. The operational radius of the Yankee compared to the operational radius of the UH-1N eclipses the former by nearly sixty nautical miles. Truly, the Yankee provides the MEU commander greater flexibility in mission accomplishment while alleviating the MV-22 from the requirement to assume all assault support missions.

Optimally, the MEU augments the proposed ACE structure with four deployed UH-1Ys. The addition of these Yankees coupled with the advancement in capability offered over the UH-1N augment the assault support requirements of the VMM. However, this additional support

HMLA DETACHMENT[17]		
	AH-1W	UH-1N
Aircraft	6	3
Pilots	14	7
Crew Chiefs/Aerial Observers	N/A	5/5

Table 4.

[16] Maj Wilson R. McGraw, USMC personal e-mail to author.
[17] Commandant of the Marine Corps. *UH-1Y Training and Readiness (T&R) Manual*, NAVMC 3500.2A, March 8, 2011, 1-4.

requires a change to doctrine. Currently, the UH-1N Training and Readiness Manual (T&R) outlines the table of organization for an HMLA. Further, it provides guidance for the support of MEU detachments. In the current construct, an HMLA squadron must retain the capability to support three detachments from a core squadron. A core squadron of legacy aircraft consists of eighteen AH-1Ws and nine UH-1Ns. As such, the T&R prescribed an HMLA detachment as shown in Table 4.

Under the current procurement program, the components of an HMLA will shift from its current organization of aircraft. HMLAs will experience a reduction in AH assets while generating an increase in their UH aircraft. Ultimately, each HMLA will operate with fifteen AH-1Zs and twelve UH-1Ys. In order to continue to facilitate the ability for an HMLA to support three detachments, this obviously necessitates a change in the detachment construct. Table 5 indicates the recommended construct of an HMLA fully equipped with the AH-1Z and UH-1Y.

The recommended shift in HMLA support is hardly radical in nature. The previous construct deployed nine aircraft, while this proposal deploys eight. The Yankee and Zulu (the common reference to the AH-1Z) also share the added benefit of incorporating eighty-five percent compatibility between the two airframes. This added benefit facilitates not only the maintenance support, but potentially facilitates the further reduction of the logistical footprint. The ability to carry similar parts for nearly eighty-five percent of the two

Proposed HMLA Detachment		
	AH-1Z	UH-1Y
Aircraft	4	4
Pilots	10	9
Crew Chiefs/Aerial Observers	N/A	6/6

Table 5.

aircraft allows the VMM to eliminate the excess parts and materials associated with two dissimilar aircraft. This could also provided space saving initiatives aboard ship.

To a certain extent, procurement inhibits the immediate implementation of this model. West Coast HMLA squadrons have fully transitioned to the Yankee. East Coast squadrons are in the process of doing so. Even when the transition is fully implemented, procurement issues remain. The Yankee's procurement program remains nested closely with that of the AH-1Z. As such, squadrons will not garner their full complement of Yankees immediately. Instead of the full complement of twelve aircraft, each squadron will maintain nine UH-1Ys until transition to the AH-1Z is complete. Therefore, the Primary Mission Aircraft Authorized (PMAA) shall not occur until this transition is complete.[18] The PMAA is the "aircraft authorized to a unit for performance of its mission."[19] By the completion of fiscal year 2017, the transition from AH-1W to AH-1Z will be complete. Until that time, HMLA squadrons will maintain nine to ten active Yankee aircraft. Therefore, until the completion of this transition, the present MEU construct requires three utility helicopters in support per the UH-1 T&R. By 2025, the assumption remains that this transition will be complete. Thereby, the composition of fifteen AH-1Zs and twelve UH-1Ys are capable of supporting the proposed MEU detachment consisting of four AH-1Zs and four UH-1Ys.[20]

Naval Air Systems Command (NAVAIR) employs a section dedicated to Aviation/Ship integration. Within this section, NAVAIR retains a "technical warrant for aircraft spot factors and deck densities for CVN and L-Class platforms."[21] Over the past several years, the

[18] LtCol Tim Fetsch, USMC and LtCol Jim Isaacs, USMC, "H-1 Update" (PowerPoint presentation, United States Marine Corps, Headquarters Marine Corps Aviation, H-1 Cell, 26 October 2011).
[19] Chief of Naval Operations. *Management of the Naval Aircraft Inventory*, OPNAVINST 5442.8, April 18, 1995, 3.
[20] Commandant of the Marine Corps. *UH-1Y Training and Readiness (T&R) Manual*, NAVMC 3500.2A, March 8, 2011, 1-3.
[21]Kevin Nace, NAVAIR, Aviation/Ship Integration, email message to author.

Aviation/Ship integration team conducted numerous studies to include Operational Logistic Footprint Assessments. These studies intend to provide senior planners with sufficient knowledge of spatial constraints of aviation class ships in order to optimize their appropriate aviation capacity. When contacted, NAVAIR informed the author that an Operational Logistic Footprint Assessment had not yet been conducted for the proposed reconfiguration depicted herein. However, based on numerous other assessments conducted, the NAVAIR representative expressed confidence that this model could deploy via an LHD.[22]

In August of 2010, NAVAIR conducted an Amphibious Assault Ship Operational Logistics Footprint Assessment for the 2015 Marine Expeditionary Unit. In their assessment, NAVAIR identified three primary areas of concern due to the congestion created by the deployment of a full VMM(Rein). These concerns included: an abundance of aircraft in locked spots (those aircraft on the flight deck that require multiple movements in order to be spotted for flight), insufficient room in the hangar bay to conduct maintenance, and a Support Equipment (SE) shortfall of nearly one hundred and nineteen items.[23] The congestion in both the hangar and flight deck is clearly indicated in Appendices D and E. In order to alleviate these issues, the report listed three potential solutions to mitigate these obstacles to effectiveness. According to the assessment, these potential solutions include: providing common SE to ACE aircraft, relocating/reducing the number of aircraft within the ACE, and removing operational capability by means of detachment aircraft.[24] Each of these assessments parallel proposals contained herein. The introduction of the UH-1Y and AH-1Z provide commonality to SE that could potentially reduce footprint. Reduction of deployed MV-22s to eight will significantly reduce the

[22] Kevin Nace, NAVAIR, personal e-mail to author.
[23] Captain Douglas B. Pack, USMC, "Amphibious Assault Ship Operational Logisitics Footprint Assessment for the 2015 Marine Expeditionary Unit (MEU) Air Combat Element (ACE)." (PowerPoint Presentation, NAS Patuxent River, MD, Aviation/Ship Integration, NAVAIR, Lakehurst, NJ, August 30, 2010).
[24] Captain Douglas B. Pack, USMC, PowerPoint, August 30, 2010.

deck congestion associated with the base line numbers (see Appendix F). Additionally, reducing the aircraft footprint in the models suggested by the assessment reduced the shortage of SE from one hundred and nineteen to fifty-five. Utilizing the detachment of aircraft to support the PMC mission could reduce the strain of SE shortfalls by providing those items as needed. Hence, the implementation of an eight plane MV-22 coupled with the redistribution of AH and UH assets ultimately alleviates significant congestion in deck and hangar space thereby affording the MEU commander the ability to retain his ACE aviation assets on one ship if he so desires.

In addition to these recommendations, the NAVAIR assessment included potential courses of actions (COA) that implemented the suggested mitigation factors. Although none mirrored exactly the suggestions contained within this paper, several came close. Particularly, NAVAIR's second COA recommended a reduction to ten embarked MV-22s (see Appendix G and H). A cursory glance at this proposal highlights the alleviation of crowded deck space. The further reduction to eight embarked MV-22s as proposed within this paper will further alleviate deck space. Additionally, the ability to place all eight MV-22s on the flight deck will create additional space in the hangar which can be utilized for maintenance and the storage of support equipment.

Aircraft Availability Impacts

Readiness and aircraft availability remain a key consideration for the commander in the utilization of his air components. In this light, the MV-22's early history experienced less than desirable results. In the aircraft's infancy, the program yielded poor availability rates. According to *Bloomberg News*, "During three periods studied during the V-22's deployment from October 2007 through April 2009, the planes were available for combat operations on average 68 percent,

57 percent, and 61 percent of the time."[25] However, early incarnations of past assault support platforms experienced similarly low numbers. Additionally, the V-22's operations in Afghanistan may impact these numbers directly. As former Deputy Commandant of Aviation, LtGen George Trautman, pointed out in an interview given to *Defense Daily*, "it can't be overlooked that Afghanistan has 'the most harsh air environment in the world,' because it is filled with fine talcum powder-like dust that is very hard on airplanes."[26] Harsh conditions compounded with a new platform and executing combat operations yields the potential for low readiness numbers as those manifested. However, these numbers continue to steadily increase. Many pilots feel that the availability of the MV-22 may exceed eighty percent in the decades to come.[27][28]

While the MV-22's availability has come into question, the Yankee achieved much greater readiness numbers in its infancy. On average, Yankee detachments that deployed recently on the West Coast enjoyed availability rates over eighty percent (See Appendix I). Again, if normal trends continue, ACE commanders may retain the capability to yield even greater availability rates for the Yankee. The availability of this platform greatly enhances the utility support provided to the MEU. These aircraft augment a robust assault capability provided by the CH-53 and MV-22 while enhancing the close air support afforded by the AH-1W/Z. Ultimately, the enhanced readiness expected from both the MV-22 and the UH-1Y offset any loss of capability from the reduction in deployed Ospreys on amphibious shipping.

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[25] Tony Capaccio, "Textron-Boeing V-22 Still Dogged By Bad Parts, Tester Says," *Bloomberg News*, January 12, 2011. http://www.bloomberg.com/news/2011-01-12/textron-boeing-v-22-osprey-aircraft-still-dogged-by-bad-parts-tester-says.html (accessed January 17, 2012).
[26] Emelie Rutherford, "Trautman: F-35 Remains Primary Issue For Successor," *Defense Daily*, September 28, 2010. *Academic OneFile.*(accessed January 17, 2012).
[27] Capt Jonathan H. Brandt, USMC email message to author.
[28] Maj Wilson R. McGraw, USMC email message to author.

Conclusions

Per General Conway's direction in *Vision and Strategy* and the President's guidance for future Department of Defense operations, the MEU enables the Marine Corps and hence the nation the flexibility to sustain the projection of American power to foreign littorals and ashore. The integration of the MAGTF's combatant elements provides a great deal of flexibility to respond to a number of situations. The ACE enhances the MEU's ability to succeed in this endeavor. However, the constraints of integrating aviation assets with amphibious shipping present numerous challenges to maximize these assets. Budgetary constraints paint a dubious picture on the availability of these precious amphibious assets that are symbiotic with the successful implementation of the MEU's mission. As such, the appropriate configuration of the MEU's forces is crucial to the successful implementation and deployment of the MEU aboard ARG shipping.

The introduction of aircraft such as the MV-22, the UH-1Y, and the AH-1Z revolutionizes the capability of the ACE providing the MEU commander tactics and techniques previously unavailable. However, despite the advancements in capability these aircraft offer over their predecessors, they are not without challenges of their own. As this paper endeavored to highlight, the composition of the ACE of yester-year does not equate to the aircraft retained within the current inventory. Particularly, using the construct of MEU's past literally does not fit the physical limitations imposed by naval shipping as a result of the larger physical and logistical footprint the MV-22 introduces to the force. As such, these limitations necessitate a change in the ACE's composition for MEU deployment.

This change manifests itself in a reduction of the aircraft the MEU deploys on ARG shipping. Particularly, the goal of the ACE is to maintain the lift capability previously inherent

to legacy aircraft while augmenting that lift capacity with the advancements of the Marine Corps' modern aircraft. While doing so, the ACE's components will fit entirely on the LHD class amphibious ship allowing the MEU commander the greatest flexibility of the support of his aircraft. In this manner, the commander retains the ability to mass his assets or disperse them to conduct split operations as the mission set dictates. However, his decision to split his asset remains his own and is not forced upon him by physical limitations requiring him to do so.

In order to provide the MEU commander this flexibility, this paper proposed the following construct of the ACE. First, the ACE reduces the amount of MV-22 aircraft previously deployed. Instead of ten aircraft (or the twelve depicted in the MV-22 T&R), the VMM deploys eight aircraft. The remaining MV-22 serve in a support capacity to the MEU by utilizing the aircraft's ability to self deploy. Additionally, the HMLA detachment realigns its T&R and supported aircraft. In particular, AH-1Z support decreases to four. This not only saves space, but satisfies T&R constraints levied to HMLA's with regards to MEU support. Additionally, the UH-1Y increases it support from three to four. This increase in Yankee support provides additional assault support to the MEU commander while simultaneously satisfying HMLA T&R requirements for detachment support. CH-53 support remains unchanged in numerical assets available, but will provide an increase in capability with the eventual introduction of the CH-53K. Fortunately, the CH-53K's footprint remains equitable to that of the CH-53E. As such, its recommended footprint remains the same.

Ultimately, the purpose of these recommendations is to facilitate the successful implementation of MEU operations. As the Department of Defense draws down from ten years of conflict, senior leadership within our Nation has articulated the need for a smaller but capable

force. The MEU fulfills this requirement. Its continued ability to project power from the sea will continue to enhance our nation's security and dominance around the globe.

Appendix A

HMLA MISSION ESSENTIAL TASK LIST (METL)[29]

Core METL. The METL is a list of specified tasks an HMLA (UH-1Y) squadron is designed to perform. Core METs are drawn from the Marine Corps Task List (MCTL), are standardized by type unit, and are used for unit readiness. Core Plus METs are additional METs that are theater specific and/or have a low likelihood of occurrence. Core Plus METs may be included in readiness reporting when contained within an Assigned Mission METL. An Assigned Mission METL consists of only the selected MCTs (drawn from Core and Core Plus METs) necessary for that Assigned Mission.

Core METL

Conduct Aviation Operations From Expeditionary Shore-Based Sites (MCT 1.3.3.3.2)
Conduct Combat Assault Transport (MCT 1.3.4.1)
Conduct Close Air Support (MCT 3.2.3.1.1)
Conduct Armed Reconnaissance (MCT 3.2.3.1.2.2)
Conduct Strike Coordination and Reconnaissance (MCT 3.2.3.1.2.3)
Conduct Forward Air Control (Airborne) (MCT 3.2.5.4)
Conduct Air Delivery (MCT 4.3.4)
Provide an Airborne Command and Control Platform for Command Elements (MCT 5.3.2.7.4)
Conduct Aviation Support of Tactical Recovery of Aircraft and Personnel (MCT 6.2.1.1)
Conduct Aerial Escort (MCT 6.1.1.11)
Conduct Air Evacuation (MCT 6.2.2)

Core Plus METs

Conduct Aviation Operations From Expeditionary Sea-Based Sites (MCT 1.3.3.3.1)
Conduct Airborne Rapid Insertion/Extraction (MCT 1.3.4.1.1)
Conduct Tactical Air Coordination (Airborne) (MCT 5.3.2.7.3)
Conduct Active Air Defense (MCT 6.1.1.8)

[29] Commandant of the Marine Corps. *Aviation Training and Readiness (T&R) Manual, UH-1*, MCO 3500.49A, December 20, 2004, 1-5.

Appendix B

VMM MISSION ESSENTIAL TASK LIST (METL)[30]

Core METL. The METL is a list of specified tasks a VMM squadron is designed to perform. Core METs are drawn from the Marine Corps Task List (MCTL), are standardized by type unit, and are used for unit readiness. Core Plus METs are additional METs that are theater specific and/or have a low likelihood of occurrence. Core Plus METs may be included in readiness reporting when contained within an Assigned Mission METL. An Assigned Mission METL consists of only the selected MCTs (drawn from Core and Core Plus METs) necessary for that Assigned Mission.

Core METL

Conduct Aviation Operations From Expeditionary Sea-Based Sites (MCT 1.3.3.3.1)
Conduct Aviation Operations From Expeditionary Shore-Based Sites (MCT 1.3.3.3.2)
Conduct Combat Assault Transport (MCT 1.3.4.1)
Conduct Air Delivery (MCT 4.3.4)
Conduct Aviation Support of Tactical Recovery of Aircraft and Personnel (TRAP)(MCT 6.2.1.1)
Conduct Air Evacuation (MCT 6.2.2)

Core Plus MET

Conduct Airborne Rapid Insertion/Extraction (MCT 1.3.4.1.1)

[30] Commandant of the Marine Corps. *MV-22 Aviation Training and Readiness (T&R) Manual*, MCO 3500.11B, March 10, 2010, 1-5.

Appendix C

MEU MISSION ESSENTIAL TASK LIST (METL)[31]

-Amphibious Operations

Conduct Amphibious Assault (MCT 1.3.2.3). The principle type of amphibious operation that involves establishing a force on a hostile or potentially hostile shore.

Conduct Amphibious Raid (MCT 1.3.2.2). To conduct short-duration, small scale deliberate attacks, from the sea, involving a swift penetration of hostile or denied battlespace. Amphibious raids are conducted in order to secure information, to confuse the enemy, or to seize, destroy, neutralize, capture, exploit, recover, or damage designated sea-based or shore-based targets. Amphibious raids end with a planned withdrawal upon completion of the assigned mission.

Conduct Maritime Interception Operations (MIO) (MCT 1.3.2.8). Operations contained in this task include Visit, Board, Search, and Seizure (VBSS), seizure of a static maritime platform and selected maritime security missions. As a subset of MIO, VBSS operations (MCT 1.3.2.9) are designed to seize a ship, vessel or maritime platform and establish positive control over critical systems in order to transition control to designated organizations. These operations may be conducted in order to counter piracy, enforce international agreements, enforce international resolutions or sanctions, confiscate contraband, or as directed in accordance with current execution orders. VBSS forces ensure the health, safety, and welfare of detained crew until turned over to appropriate legal authorities. The MEU, supported by the ARG, will be trained and equipped to execute complex synchronized VBSS missions to include non-compliant and opposed boarding less specific situations that require the employment of SOF.

Conduct Advance Force Operations (MCT 1.6.10). To shape the battlespace in preparation for the main assault or other operations of an amphibious or Joint force by providing battlespace awareness and conducting such operations as reconnaissance, seizure of supporting positions, preliminary bombardment, and air support.

-Expeditionary Support to Other Operations / Crisis Response and Limited Contingency Operations

Conduct Noncombatant Evacuation Operations (NEO) (MCT 1.6.6.6). Operations directed by Department of State whereby noncombatants are evacuated from foreign countries to safe havens or to the U.S., as directed, when their lives are endangered by war, civil unrest, or natural disaster.

Conduct Humanitarian Assistance (HA) (MCT 1.6.6.7). Assistance to relieve or reduce the results of natural or man-made disasters or other endemic conditions such as human pain,

[31] Commandant of the Marine Corps, *Policy for Marine Expeditionary Units (MEU) and Marine Expeditionary Units (Special Operations Capable) MEU (SOC)*, MCO 3120.9C, August 4, 2009, 5-7.

disease, hunger, or privation that might present threat to life or could result in great damage to or loss of property. Normally these operations are limited in scope and duration. The assistance provided is designed to supplement or complement the efforts of the host nation, civil authorities and/or agencies that may have the primary responsibility for providing humanitarian assistance.

Conduct Stability Operations (SO) (MCT 1.6.6.9). Stability operations are conducted to help establish order that advances U.S. interests and values. U.S. military forces shall be prepared to perform all tasks necessary to establish or maintain order when civilians cannot do so, in an effort to secure a lasting peace and facilitate the withdrawal of U.S. troops.

Conduct Tactical Recovery of Aircraft and Personnel (TRAP) (MCT 6.2.1). This includes rescue or extraction, by surface or air, of downed aircraft and/or personnel and equipment, conduct aircraft sanitization, and provide trauma life support in a benign or hostile environment.

Conduct Joint and Combined Operations (MCT 5.5). To conduct joint force organization and joint coalition operations. Joint forces are designated, composed of significant elements, assigned or attached, of two or more Military Departments, and commanded by a Joint Force Commander (JFC) with a joint staff. The principle in joint force organization is that JFCs organize forces to accomplish the mission based on the JFC's vision and concept of operations, with considerations involving unity of effort, centralized planning and direction, and decentralized execution.

Conduct Aviation Operations from expeditionary shore-based sites (MCT 1.3.3.3.2). The MAGTF's power-projection capability is based on its ability to move rapidly and operate freely within in an objective anywhere in the world. To provide responsiveness in austere expeditionary environments, Marine aviation units maintain the capability to operate from amphibious shipping, forward operating bases (FOBs), Expeditionary Airfields (EAFs), Forward Arming and Refueling Points (FARPs), austere forward operating sites, tactical landing zones, etc. that are in line with platform and unit capabilities.

Conduct/Support Theater Security Cooperation (TSC) Activities (MCT 5.5.5). Theater Security Cooperation (TSC) activities are combined and multinational military non-combat activities conducted with other nations within a theater in order to create favorable military geographical balances of power, advance mutual defense or security arrangements, and build allied and friendly military capabilities for self-defense and multinational operations.

Conduct Airfield/Port Seizure (MCT 1.6.5.6). Secure an airfield, port or other key facilities in order to support MAGTF missions, receive follow-on forces or enable the introduction of follow-on forces.

-Special Operations (Conducted by associated MARSOF)

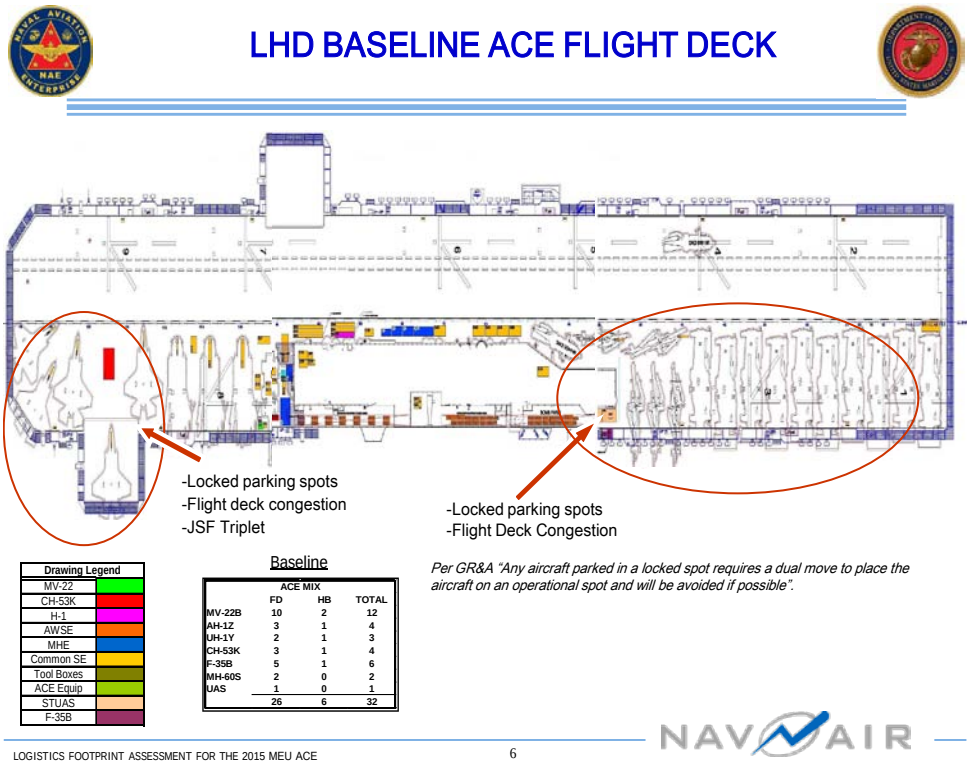
Conduct Direct Action Operations (DA) (MCT 1.6.5.10, JP 1-02). Short duration strikes and other small-scale offensive actions conducted as a special operation in hostile, denied or politically sensitive environments and which employ specialized military capabilities to seize, destroy, capture, exploit, recover, or damage designated targets. Direct action differs from conventional offensive actions in the level of physical and political risk, operational techniques and the degree of discriminate and precise use of force to achieve specific objectives.

Conduct Special Reconnaissance (SR) (JP 1-02). Reconnaissance and surveillance actions conducted as a special operation in hostile, denied, or politically sensitive environments to collect or verify information of strategic or operational significance, employing military capabilities not normally found in conventional forces. These actions provide an additive capability for commanders and supplement other conventional reconnaissance and surveillance actions.

Conduct Foreign Intelligence Defense (FID) (JP 1-02). Participation by civilian and military agencies of a government in any of the action programs taken by another government or other designated organization to free and protect it society from subversion, lawlessness, and insurgency.

Appendix D

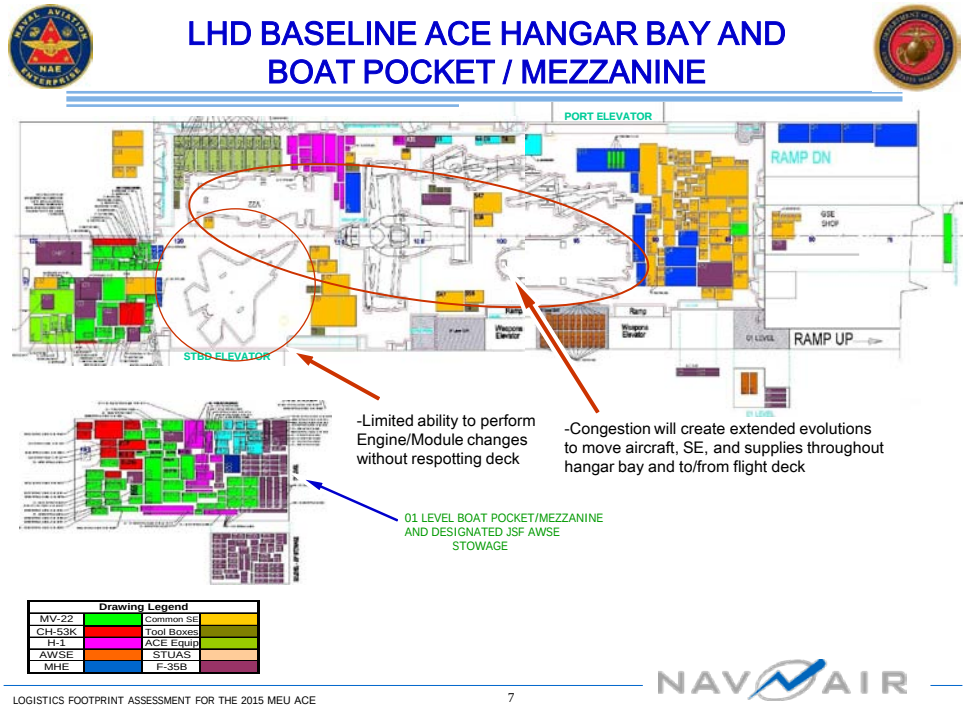
LHD BASELINE FLIGHT DECK[32]



[32] Captain Douglas B. Pack, USMC, "Amphibious Assault Ship Operational Logisitics Footprint Assessment for the 2015 Marine Expeditionary Unit (MEU) Air Combat Element (ACE)." (PowerPoint Presentation, NAS Patuxent River, MD, Aviation/Ship Integration, NAVAIR, Lakehurst, NJ, August 30, 2010).

Appendix E

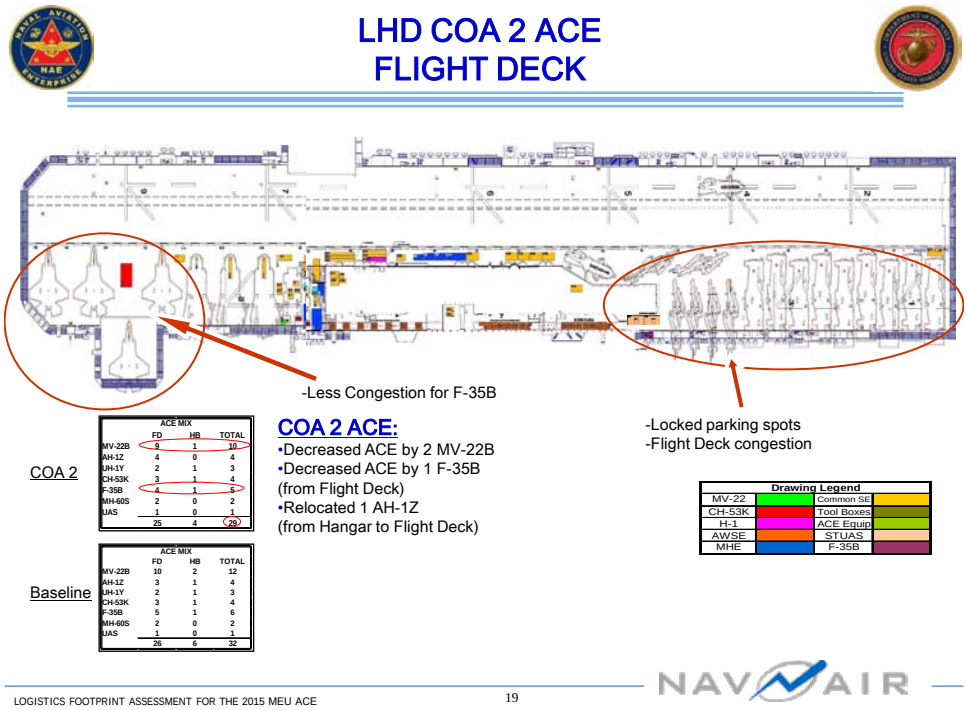
LHD BASELINE HANGER BAY[33]



[33] Captain Douglas B. Pack, USMC, "Amphibious Assault Ship Operational Logisitics Footprint Assessment for the 2015 Marine Expeditionary Unit (MEU) Air Combat Element (ACE)." (PowerPoint Presentation, NAS Patuxent River, MD, Aviation/Ship Integration, NAVAIR, Lakehurst, NJ, August 30, 2010).

Appendix F

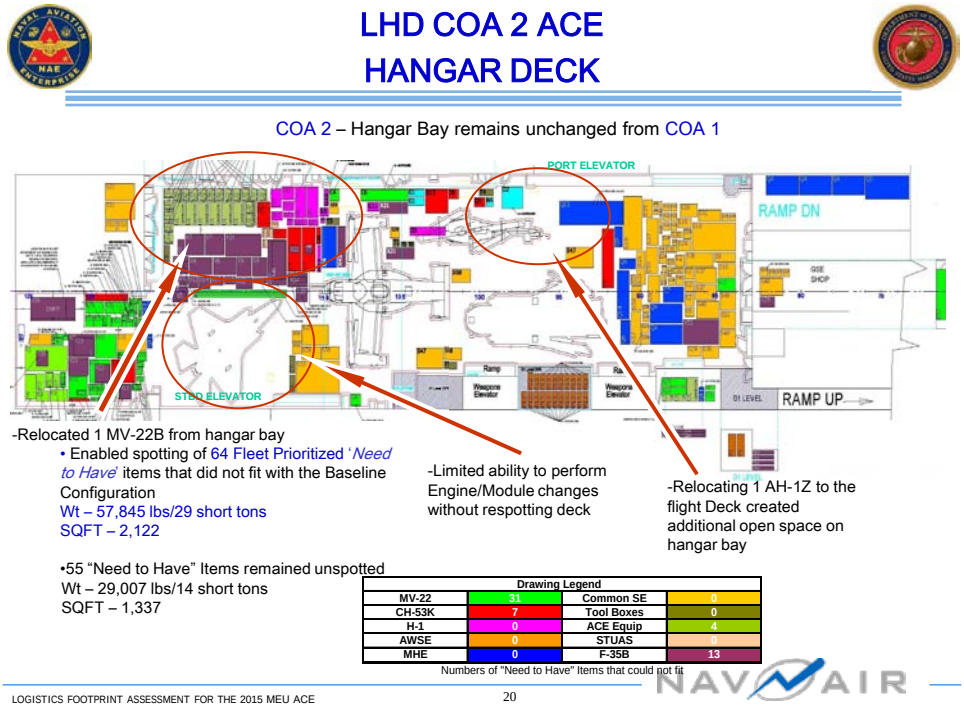
LHD Flight Deck (NAVAIR COA 2)[34]



[34] Captain Douglas B. Pack, USMC, "Amphibious Assault Ship Operational Logisitics Footprint Assessment for the 2015 Marine Expeditionary Unit (MEU) Air Combat Element (ACE)." (PowerPoint Presentation, NAS Patuxent River, MD, Aviation/Ship Integration, NAVAIR, Lakehurst, NJ, August 30, 2010).

Appendix G

LHD Hangar Deck (NAVAIR COA 2)[35]



[35] Captain Douglas B. Pack, USMC, "Amphibious Assault Ship Operational Logisitics Footprint Assessment for the 2015 Marine Expeditionary Unit (MEU) Air Combat Element (ACE)." (PowerPoint Presentation, NAS Patuxent River, MD, Aviation/Ship Integration, NAVAIR, Lakehurst, NJ, August 30, 2010).

Appendix H

Aviation Maintenance/Supply Readiness Reporting 2011 H-1 Summary[36]

H-1 AMSRR Summary								Date:	2/28/2012							
H-1 USMC T/M/S		ASN	IR	OOR	MC	FMC	RBA	NMCM	NMCSP	MCMP	MCS	MC%	FMC%	NMC%	RBA% (IR/RBA)	12 MO AVG*
UH-1Y	ALL USMC	16	14	2	12	9	12	0	1	0	3	85.7%	64.3%	14.3%	85.7%	66.2%
RBA % LEGEND		0-64.9%			65-74.9%			75-100%		CNO GOALS:		85.0%	75.0%			
OEF UNIT	TMS	ASN	IR	OOR	MC	FMC	RBA	NMCM	NMCSP	MCMP	MCS	MC%	FMC%	NMC%	RBA % (RBA/I	SINCE DEPLO
HMLA-369(OEF)	AH-1W	18	16	2	15	14	15	0	1	0	1	94%	88%	6%	93.8%	80.5%
HMLA-369(OEF)	UH-1Y	10	8	2	7	4	7	0	0	0	3	88%	50%	13%	87.5%	74.1%
OEF UH-1Y	Totals:	10	8	2	7	4	7	0	0	0	3	87.5%	50.0%	12.5%	87.5%	70.8%
OEF ALL	Totals:	10	8	2	7	4	7	0	0	0	3	87.5%	50.0%	12.5%	87.5%	70.8%
MEU DETS* UNIT	TMS	ASN	IR	OOR	MC	FMC	RBA	NMCM	NMCSP	MCMP	MCS	MC%	FMC%	NMC%	RBA % (RBA/I	SINCE CHOP
HMM-268/11th MEU	UH-1Y	3	3	0	3	3	3	0	0	0	0	100%	100%	0%	100.0%	88.4%
HMM-364/15th MEU	UH-1Y	3	3	0	2	2	2	0	1	0	0	67%	67%	33%	66.7%	0.0%
MEU UH-1Y	Totals:	6	6	0	5	5	5	0	1	0	0	83.3%	83.3%	16.7%	83.3%	86.5%

[36] Major John D. Peterson, USMC e-mail message to author.

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